

What is claimed is:

1. A position control system for a remote-controlled vehicle, the system comprising:
  - 5 an electromagnetic energy receiver configured to receive an electromagnetic beam and further configured to generate a control signal indicative of a position of the remote-controlled vehicle relative to a position of the electromagnetic beam;
  - a propulsion system; and
  - 10 a positioning control system configured to receive the control signal and maneuver the remote-controlled vehicle by directing the propulsion system in response the control signal.
2. The system of Claim 1, wherein the electromagnetic energy receiver includes at least one photoelectric cell configured to generate electrical power when subjected to application of electromagnetic energy.
3. The system of Claim 2, wherein the photoelectric cell includes a solar cell.
- 15 4. The system of Claim 1, wherein the electromagnetic energy receiver is configured to receive an externally-applied laser signal.
5. The system of Claim 1, wherein the electromagnetic energy receiver includes an electromagnetic receiving array including a plurality of electromagnetic sensors, each of the electromagnetic sensors being configured to generate a sensor output indicative of an 20 intensity of electromagnetic energy received by the electromagnetic sensor.
6. The system of Claim 5, wherein the control signal includes the sensor output of each of the electromagnetic sensors.
7. The system of Claim 6, wherein the positioning control system is further configured to generally equalize the sensor output of each of the electromagnetic sensors by 25 maneuvering the remote-controlled vehicle such that the electromagnetic beam is received toward a center of the electromagnetic receiving array.
8. The system of Claim 7, wherein the positioning control system is further configured to maneuver the remote-controlled vehicle relative to the source of the electromagnetic beam such that the remote-controlled vehicle maintains a predetermined distance from the source 30 of the electromagnetic beam.

9. The system of Claim 8, wherein the positioning control system is further configured to receive external commands for adjusting a response to the electromagnetic beam.

10. The system of Claim 1, wherein the remote-controlled vehicle includes an airborne vehicle.

5       11. The system of Claim 10, wherein the positioning control system is further configured to maintain the airborne vehicle at a level attitude.

12. The system of Claim 10, further comprising a propulsion system including at least one rotor disposed to generate lift.

10      13. The system of Claim 12, wherein the propulsion system includes a plurality of individually controllable lift rotors, each of the individually controllable lift rotors being further configured to generate a variable quantity of thrust such that a composite thrust of the plurality of individually controllable lift rotors provides at least one of a lift and a thrust component in a direction generally perpendicular to the lift.

15      14. The system of Claim 10, wherein the propulsion system includes at least one rotor disposed to generate thrust in a direction generally perpendicular to the lift.

15      15. The system of Claim 10, wherein the airborne vehicle includes a hovering vehicle configured to generate sufficient lift to support the airborne vehicle aloft.

16. The system of Claim 10, wherein the airborne vehicle includes a lighter-than-air vehicle.

20      17. The system of Claim 1, wherein the remote-controlled vehicle includes a land-based vehicle.

18. The system of Claim 1, wherein the remote-controlled vehicle includes a water-based vehicle configured to operate at least one of on the surface or under the surface of a body of water.

25      19. The system of Claim 1, wherein the remote-controlled vehicle includes a space-based vehicle configured to operate in at least a partial vacuum.

20. The system of Claim 1, further comprising at least one surveillance device configured to capture data from the perspective of the remote-controlled vehicle.

21. The system of Claim 20, wherein the surveillance device is configured to transmit telemetry to a telemetry station.

22. The system of Claim 21, wherein the surveillance device is remotely controllable from a control station.

5       23. The system of Claim 22, wherein the surveillance device includes at least one of a camera, a microphone, a chemical sensor, a biological sensor, a radiation detector, and an environmental sensor.

24. The system of Claim 1, further comprising at least one relay device configured to relay an electromagnetic signal.

10      25. The system of Claim 24, further comprising a movable base, wherein the movable base is configured to adjust a position of the relay device.

26. The system of Claim 24, wherein the electromagnetic relay device includes a reflector configured to relay the electromagnetic signal.

27. The system of Claim 26, wherein the relay device includes a mirror.

15      28. The system of Claim 24, wherein the electromagnetic relay device includes a signal repeater configured to receive and resend an electromagnetic signal.

29. The system of Claim 28, wherein the electromagnetic relay device includes a microwave relay.

20      30. The system of Claim 24, wherein electromagnetic signal includes a communications signal.

31. The system of Claim 24, wherein the electromagnetic signal includes an energy weapon beam.

32. The system of Claim 31, wherein the energy weapon beam includes a high-powered laser signal.

25      33. The system of Claim 1, further comprising a payload delivery mechanism.

34. A remote-controlled vehicle comprising:  
a vehicle housing;

an electromagnetic energy receiver mounted on the vehicle housing, the electromagnetic energy receiver being configured to receive an electromagnetic beam and further configured to generate a control signal indicative of a position of the remote-controlled vehicle relative to a position of the electromagnetic beam;

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a propulsion system mounted on the vehicle housing; and

a positioning control system configured to receive the control signal and maneuver the remote-controlled vehicle by directing the propulsion system in response the control signal.

10 35. The vehicle of Claim 34, wherein the electromagnetic energy receiver includes at least one photoelectric cell configured to generate electrical power when subjected to application of electromagnetic energy.

36. The vehicle of Claim 35, wherein the photoelectric cell includes a solar cell.

15 37. The vehicle of Claim 34, wherein the electromagnetic energy receiver is configured to receive an externally-applied laser signal.

38. The vehicle of Claim 34, wherein the electromagnetic energy receiver includes an electromagnetic receiving array including a plurality of electromagnetic sensors, each of the electromagnetic sensors being configured to generate a sensor output indicative of an intensity of electromagnetic energy received by the electromagnetic sensor.

20 39. The vehicle of Claim 38, wherein the control signal includes the sensor output of each of the electromagnetic sensors.

40. The vehicle of Claim 39, wherein the positioning control system is further configured to generally equalize the sensor output of each of the electromagnetic sensors by maneuvering the remote-controlled vehicle such that the electromagnetic beam is received 25 toward a center of the electromagnetic receiving array.

41. The vehicle of Claim 40, wherein the positioning control system is further configured to maneuver the remote-controlled vehicle relative to the source of the electromagnetic beam such that the remote-controlled vehicle maintains a predetermined distance from the source of the electromagnetic beam.

42. The vehicle of Claim 41, wherein the positioning control system is further configured to receive external commands for adjusting a response to the electromagnetic beam.

43. The vehicle of Claim 34, wherein the remote-controlled vehicle includes an airborne vehicle.

44. The vehicle of Claim 43, wherein the positioning control system is further configured to maintain the airborne vehicle at a level attitude.

45. The vehicle of Claim 43, further comprising a propulsion system including at least one rotor disposed to generate lift.

46. The vehicle of Claim 45, wherein the propulsion system includes a plurality of individually controllable lift rotors, each of the individually controllable lift rotors being further configured to generate a variable quantity of thrust such that a composite thrust of the plurality of individually controllable lift rotors provides at least one of a lift and a thrust component in a direction generally perpendicular to the lift.

47. The vehicle of Claim 43, wherein the propulsion system includes at least one rotor disposed to generate thrust in a direction generally perpendicular to the lift.

48. The system of Claim 43, wherein the airborne vehicle includes a hovering vehicle configured to generate sufficient lift to support the airborne vehicle aloft.

49. The system of Claim 43, wherein the airborne vehicle includes a lighter-than-air vehicle.

50. The vehicle of Claim 34, wherein the remote-controlled vehicle includes a land-based vehicle.

51. The vehicle of Claim 34, wherein the remote-controlled vehicle includes a water-based vehicle configured to operate at least one of on the surface or under the surface of a body of water.

52. The vehicle of Claim 34, wherein the remote-controlled vehicle includes a space-based vehicle configured to operate in at least a partial vacuum.

53. The vehicle of Claim 34, further comprising at least one surveillance device configured to capture data from the perspective of the remote-controlled vehicle.

54. The vehicle of Claim 53, wherein the surveillance device is configured to transmit telemetry to a telemetry station.

5 55. The vehicle of Claim 54, wherein the surveillance device is remotely controllable from a control station.

56. The vehicle of Claim 55, wherein the surveillance device includes at least one of a camera, a microphone, a chemical sensor, a biological sensor, a radiation detector, and an environmental sensor.

10 57. The vehicle of Claim 34, further comprising at least one relay device configured to relay an electromagnetic signal.

58. The vehicle of Claim 57, further comprising a movable base, wherein the movable base is configured to adjust a position of the relay device.

15 59. The vehicle of Claim 57, wherein the electromagnetic relay device includes a reflector configured to relay the electromagnetic signal.

60. The vehicle of Claim 58, wherein the relay device includes a mirror.

61. The vehicle of Claim 57, wherein the electromagnetic relay device includes a signal repeater configured to receive and resend an electromagnetic signal.

20 62. The vehicle of Claim 61, wherein the electromagnetic relay device includes a microwave relay.

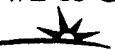
63. The vehicle of Claim 57, wherein electromagnetic signal includes a communications signal.

64. The vehicle of Claim 57, wherein the electromagnetic signal includes an energy weapon beam.

25 65. The vehicle of Claim 64, wherein the energy weapon beam includes a high-powered laser signal.

66. The vehicle of Claim 34, further comprising a payload delivery mechanism.

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67. A method for positioning a remote-controlled vehicle at a desired aerial location, the method comprising:

receiving an electromagnetic beam;  
detecting a position of the remote-controlled vehicle relative to a position of the  
electromagnetic beam; and  
maneuvering the remote-controlled vehicle to follow the electromagnetic beam to  
the desired position.

5           68. The method of Claim 67, wherein the electromagnetic beam is received using at least one photoelectric cell configured to generate electrical power when subjected to  
10 application of electromagnetic energy.

15           69. The method of Claim 68, wherein the photoelectric cell includes a solar cell.

70. The method of Claim 69, wherein receiving the electromagnetic beam includes receiving an externally-applied laser signal.

15           71. The method of Claim 67, wherein the remote-controlled vehicle is maneuvered to follow the electromagnetic beam using a plurality of electromagnetic sensors, each of the electromagnetic sensors generating a sensor output indicative of an intensity of electromagnetic energy received by the electromagnetic sensor from the electromagnetic beam.

20           72. The method of Claim 71, further comprising maneuvering the remote-controlled vehicle to generally equalize the sensor output of each of the electromagnetic sensors such that the electromagnetic beam is received generally evenly by the electromagnetic sensors.

73. The method of Claim 72, further comprising maneuvering the remote-controlled vehicle relative to the source of the electromagnetic beam such that the remote-controlled vehicle maintains a predetermined distance from the source of the electromagnetic beam.

25           74. The method of Claim 73, further comprising receiving external commands to adjust a response of the remote-controlled vehicle to the electromagnetic beam.

75. The method of Claim 67, wherein the remote-controlled vehicle includes an airborne vehicle.

76. The method of Claim 75, wherein the airborne vehicle includes a hovering vehicle configured to generate sufficient lift to support the airborne vehicle aloft.

77. The system of Claim 75, wherein the airborne vehicle includes a lighter-than-air vehicle.

5        78. The method of Claim 67, wherein the remote-controlled vehicle includes a land-based vehicle.

79. The method of Claim 67, wherein the remote-controlled vehicle includes a land-based vehicle.

10      80. The method of Claim 67, wherein the remote-controlled vehicle includes a water-based vehicle configured to operate at least one of on the surface and under the surface of a body of water.

81. The system of Claim 67, wherein the remote-controlled vehicle includes a space-based vehicle configured to operate in at least a partial vacuum.

